

PINEHURST WATER DISTRICT (PWSNO 1400041)
SOURCE WATER ASSESSMENT REPORT

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State of Idaho
Department of Environmental Quality

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for Pinehurst Water District*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The Pinehurst Water District drinking water comes from two 98-foot deep wells that replaced a surface water source in 1996. The wells are completed in a confined alluvial aquifer. The main water quality problem at Pinehurst is corrosivity, which is being successfully treated chemically. In a susceptibility analysis conducted by DEQ October 17, 2000, both wells ranked moderately susceptible to contamination by inorganic, volatile organic and synthetic organic chemicals and microbials. Physical characteristics of the aquifer at the well site added more points to the final susceptibility score than the presence of potential contaminants in the delineated well protection zone. For example the depth to ground water is less than 300 feet, the wells are in the flood plain, and the soil layer above the water table is composed of fractured rock or gravel.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

Most of the designated area is outside the direct jurisdiction of The City of Pinehurst. Partnerships with state and local agencies and industry groups should be established and are critical to success. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term

A community with a fully developed source water protection program will incorporate many strategies. For assistance in developing protection strategies, please contact your regional Idaho Department of Environmental Quality office or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR PINEHURST WATER DISTRICT

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings, used to develop this assessment, is also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of this assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho Department of Environmental Quality (DEQ) recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Geographic Location of Pinehurst Water District.



Section 2. Conducting the Assessment

General Description of the Source Water Quality

Pinehurst Idaho is a community of approximately 2000 people, located near the confluence of Pine Creek and the South Fork of the Coeur d'Alene River in Shoshone County (Figure 1). The Pinehurst Water District drinking water comes from two 98-foot deep wells. The wells are close together and are tested as a single source.

Since disconnection of the surface water source in October 1996, the main water quality problems Pinehurst has experienced are associated with corrosivity. Corrosion abatement equipment was installed in 1998. A comprehensive preliminary test in March 1993 before the wells came on line detected the following contaminants, all at concentrations well below the Maximum Contaminant Level (MCL).

Contaminant	MCL	Sample Results
Cadmium	0.005 mg/l	0.00084. mg/l
Mercury	0.002 mg/l	0.0005 mg/l
Nitrate	10.0 mg/l	0.35 mg/l
Lead	Action Level 15 µl	4.1 µl

The unregulated contaminant chloromethane was detected at a concentration of 1.85 µl in a sample tested in 1998, but it was not found in routine sampling the following year. Radionuclides in concentrations below the MCL have been present in Pinehurst water since testing began in 1980.

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time of travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer. DEQ used a refined computer model approved by the EPA in determining the three-year (Zone 1B), six-year (Zone 2), and ten-year (Zone 3) time-of-travel (TOT) for water associated with the Silver Valley Coeur d'Alene River aquifer system in the vicinity of Pinehurst. The computer model used site-specific data, assimilated by DEQ from a variety of sources including the city and other local well logs. The delineated source water assessment area for Pinehurst Water District follows the valley floor south of town and branches where Pine Creek forks. The actual data used by DEQ in determining the source water assessment delineation areas are available upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant historical land use outside the Pinehurst Water District is mining. Land use within Pinehurst city limits consists of residential homes, small businesses, and light manufacturing. Homes within Pinehurst are connected to a sewer system, while homes outside of town operate with individual septic systems.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted. The first phase involved identifying and documenting potential contaminant sources within the Pinehurst Water District Source Water Assessment Area through the use of computer databases and Geographic Information System maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Shirley Gann of the Pinehurst Water District.

A total of 22 potential contaminant sites are located within the delineated source water areas (Table 1). Most of the potential contaminant sources within delineated source water areas are located in the six year time of travel zone which encompasses the West Fork of Pine Creek and the main stem from Klondike Gulch to Langlois Creek. Potential contaminant sources located in the Pinehurst Water District delineated source water area include numerous inactive mine and mill sites, an auto body repair and paint shop and a junkyard. The system operator also noted the location of a golf course and gas station that are near the city wells though outside of the delineation boundaries (Figure 2).

Contaminants of concern are primarily related to mining. Table 1 lists the potential contaminants of concern, time of travel zones, and information source.

Figure 2. Pinehurst Water District Delineation Map and Contaminant Inventory.



Table 1. Pinehurst Water District Potential Contaminant Inventory

MAPID	Site Description	TOT ZONE:	Potential Contaminants	Source of Information
1	TAILINGS IMPOUNDMENT	3 YR	IOC	CERCLA DATABASE
2	MILLSITE & TAILINGS	3 YR	IOC	CERCLA DATABASE
3	GRAVEL PIT	3 YR	SEDIMENT	MINE DATABASE
4	LEAD MINE	3 YR	IOC	MINE DATABASE
5	LEAD MINE	3 YR	IOC	MINE DATABASE
6	ZINC MINE	3 YR	IOC	MINE DATABASE
7	LEAD MINE	3 YR	IOC	MINE DATABASE
8	AUTO BODY/PAINT SHOP	3 YR	SOC, VOC	ENHANCED INVENTORY
9	LEAD MINE	6 YR	IOC	CERCLA DATABASE
10	MILLSITE TAILINGS & ROCKDUMP	6 YR	IOC, SEDIMENT	CERCLA DATABASE
11	LEAD MINE	6 YR	IOC	MINE DATABASE
12	LEAD MINE	6 YR	IOC	MINE DATABASE
13	LEAD MINE	6 YR	IOC	MINE DATABASE
14	LEAD MINE	6 YR	IOC	MINE DATABASE
15	TUNGSTEN MINE	6 YR	IOC	MINE DATABASE
16	LEAD MINE	6 YR	IOC	MINE DATABASE
17	LEAD MINE	6 YR	IOC	MINE DATABASE
18	LEAD MINE	6 YR	IOC	MINE DATABASE
19	LEAD MINE	6 YR	IOC	MINE DATABASE
20	JUNK YARD	6 YR	SOC, VOC	ENHANCED INVENTORY
21	MANGANESE MINE	10 YR	IOC	MINE DATABASE
22	MINE	10 YR	IOC	MINE DATABASE

¹ UST = underground storage tank, (explain all acronyms, tables supposed to stand alone)

² TOT = time of travel (in years) for a potential contaminant to reach the wellhead

³ IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Section 3. Susceptibility Analyses

The susceptibility of the sources to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

Hydrologic Sensitivity

Hydrologic sensitivity was moderate for both wells (Table 2). This reflects the shallow alluvial nature of the aquifer, with clay layers only about 20 feet deep retarding the vertical transport of contaminants.

Well Construction

Well construction directly affects the ability of the wells to protect the aquifer from contaminants. Lower scores imply a system that can better protect the water. The Pinehurst Water District drinking water system consists of two wells that extract ground water for domestic and industrial uses. Because the wells are close together they comprise a well field drawing water from a single source. Construction scores for both well were moderate. There is some risk of contamination to the aquifer because the wells are located in the 100-year flood plain and the pumping level is less than 100 feet below the static water level.

The wells in the Pinehurst Water District system are 98 feet deep. They are completed in a confined alluvium aquifer. The 12-inch steel casing extends to a depth of 81 feet, ending in a layer of coarse sand and gravel below a hard packed gray clay layer. The well screen extends from 81 to 97 feet. The bentonite clay surface seal depth is 38 feet.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems to meet DEQ standards. IDAPA 58.01.08.550 requires Public Water Systems to follow the *Recommended Standards for Water Works (1997)* during construction. Various aspects of the standards can be assessed from well logs. Table 1 of the *Recommended Standards for Water Works (1997)* states that 12-inch steel casing requires a thickness of 0.375 inches. The Pinehurst wells have 0.250-inch thick casing.

Potential Contaminant Source and Land Use

Both wells rated in the moderate category for contamination by inorganic chemicals, volatile organic chemicals and synthetic organic chemicals. The number of mines in the 3-year time of travel zone added the most points to the scoring for inorganic chemicals. The potential contaminant source/land use score for microbials was low.

Final Susceptibility Ranking

In terms of the total susceptibility score, it can be seen from Table 2 that both wells ranked moderately susceptible to all four classes of contaminants. The final ranking for susceptibility to microbial contamination reflects the combination of hydrological sensitivity and well construction scores.

Table 2. Summary of Pinehurst Water District Susceptibility Evaluation

Susceptibility Scores ¹										
Well	Hydrologic Sensitivity	Contaminant Inventory				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
1	M	M	M	M	L	M	M	M	M	M
2	M	M	M	M	L	M	M	M	M	M

¹H = High Susceptibility, M = Moderate Susceptibility, Low Susceptibility

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

²H* - Indicates source automatically scored as high susceptibility due to presence of either a VOC, SOC or an IOC above the maximum contaminant level in the tested drinking water

Susceptibility Summary

The Pinehurst Water District drinking water quality is currently good. Wells in the Pinehurst Water District system take their water from a shallow, confined alluvial aquifer, which becomes unconfined a short distance up Pine Creek from Pinehurst. The corrosivity of the water has been successfully managed with chemical treatment. The wells are at moderate risk for contamination, mostly because of their location in the 100-year flood plain and because of the shallowness of the aquifer into which they are drilled.

Section 4. Options for Source Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective source water protection program is tailored to the particular local source water protection area. A community with a fully developed source water protection program will incorporate many strategies. For Pinehurst Water District source water protection activities should focus on maintenance practices aimed at reducing the risk to the well from flooding. The immediate area around the well is under the direct jurisdiction of Pinehurst Water District, but partnerships with state and local agencies and industry groups should be established to work out land use regulations and to implement non-regulatory protection measures in the area contributing water to the wells. Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

Assistance

Public water supplies and others may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional IDEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at 1-208-343-7001. For assistance with wellhead protection strategies.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

Idaho Department of Agriculture, 1998. Unpublished Data.

Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Idaho Department of Environmental Quality, 1999. Idaho Source Water Assessment Plan.

Idaho Department of Environmental Quality, 2000. Protecting Drinking Water Sources in Idaho.

Idaho Department of Environmental Quality, 2000. Unpublished Report: *Hydrogeologic Summary for Delineation of Time of Travel Capture Zones for Public Water Sources in the Silver Valley/Coeur d'Alene River Hydrogeologic Province.*

Attachment A

Pinehurst Water District Susceptibility Analysis Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- > 13 High Susceptibility

Ground Water Susceptibility Report

Public Water System Name : **PINEHURST WATER DIST**

Source: **Wells #1& #2**

Public Water System Number : **1400041**

10/17/00 10:55:25 AM

1. System Construction		SCORE			
Drill Date	3/9/00				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES	0			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	YES	0			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	NO	1			
Total System Construction Score		3			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	YES	0			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		4			
		IOC	VOC	SOC	Microbial
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)		Score	Score	Score	Score
Land Use Zone 1A	RANGELAND, WOODLAND, PASTURE	0	0	0	0
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		0	0	0	0
Potential Contaminant / Land Use - ZONE 1B (3 YR. TOT)					
Contaminant sources present (Number of Sources)	YES	4	1	1	0
(Score = # Sources X 2) 8 Points Maximum		8	2	2	0
Sources of Class II or III leacheable contaminants or Microbials	YES	3	0	0	
4 Points Maximum		3	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Less Than 25% Agricultural Land	0	0	0	0
Total Potential Contaminant Source / Land Use Score - Zone 1B		11	2	2	0
Potential Contaminant / Land Use - ZONE II (6 YR. TOT)					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or Microbials	YES	1	1	1	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		3	3	3	0
Potential Contaminant / Land Use - ZONE III (10 YR. TOT)					
Contaminant Source Present	YES	1	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of Zone	NO	0	0	0	
Total Potential Contaminant Source / Land Use Score - Zone III		1	0	0	0
Cumulative Potential Contaminant / Land Use Score		15	5	5	0
4. Final Susceptibility Source Score		10	8	8	7
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate

POTENTIAL CONTAMINANT INVENTORY

LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as **Superfund** is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100-year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.